APPLICATION FOR UNITED STATES LETTERS PATENT

FOR

EXPANDABLE SCAFFOLD WITH WHEEL LOCK

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EXPANDABLE SCAFFOLD WITH WHEEL LOCK

T chnical Field

[0001] The present disclosure relates to a maneuverable, expandable scaffold structure.

Background

[0002] Construction projects often call for the use of scaffolding. Scaffolds tend to be cumbersome structures, with a length and height determined by the demands of the job. Scaffolding may comprise fixed-sized platforms that are assembled with vertical supports and rails on the site. This creates a problem when different lengths of platform are needed (for example, one length for longer walls, and a shorter length for shorter walls). United States Patents No. 6,109,391, 5.031,722, 3,491,852, and 2,910,135 describe such scaffolds.

[0003] A pre-constructed scaffold may be used, having a fixed platform length. The pre-constructed scaffold may ride on wheels. Again, a problem with fixed-length pre-constructed scaffolds arises in situations where different lengths of platform are needed.

[0004] Various types of expandable scaffolds exist, particularly for use inside large storage vessels. These scaffolds are designed to collapse and fit through doorways, then to be expanded once they are inside the storage vessels. United States Patent No. 5,533,592 is an example of such a scaffold. Once in place, the platform length is fixed.

[0005] Various types of extendable scaffolds exist, particularly for mounting on vehicles and providing an adjustable scaffold height. United States Patent No. 4,060,148 is an example of such a scaffold. Although the height of the scaffold is adjustable, the platform length is not.

Summary

[0006] The following summary is intended to highlight and introduce some aspects of the disclosed embodiments, but not to limit the scope of the invention. Thereafter, a detailed description of illustrated embodiments is presented, which will permit one skilled in the relevant art to make and use aspects of the invention. One skilled in the relevant art can obtain a full appreciation of aspects of the invention from the subsequent detailed description, read together with the figures, and from the claims (which follow the detailed description).

[0007] A scaffold includes an expandable platform assembly supported by legs. The platform assembly has at least two shelves. At least one of the shelves slides in a lengthwise direction in relation to the others. At least one leg of the scaffold includes a rod and a spring to urge the rod through an aperture in a caster and into contact with a wheel. The aperture is formed to pass the rod in limited orientations of the rod with respect to the caster.

Brief Description of the Drawings

[0008] The headings provided herein are for convenience only and do not necessarily affect the scope or meaning of the claimed invention.

[0009] In the drawings, the same reference numbers and acronyms identify elements or acts with the same or similar functionality for ease of understanding and convenience. To easily identify the discussion of any particular element or act, the most significant digit or digits in a reference number refer to the figure number in which that element is first introduced.

[0010] Figure 1 is an illustration of an embodiment of an expandable scaffold.

[0011] Figure 2 is an illustration of an embodiment of an expandable scaffold platform assembly.

[0012] Figure 3 is a bottom view illustration of an embodiment of an expandable scaffold platform rail assembly.

[0013] Figure 4 is an illustration of an embodiment of an upper shelf of an expandable scaffold platform assembly.

[0014] Figure 5 is a side view illustration of an embodiment of an upper shelf of an expandable scaffold platform assembly.

[0015] Figure 6 is a side view illustration of an embodiment of an expandable scaffold platform rail assembly.

[0016] Figure 7 is a cut-away front view illustration of an embodiment of an expandable scaffold platform rail assembly.

[0017] Figure 8 is an illustration of an embodiment of a leg assembly of an expandable scaffold.

[0018] Figure 9 is an illustration of an embodiment of a leg assembly including a wheel lock.

[0019] Figure 10 is a cut away top view illustration of an embodiment of a wheel lock.

[0020] Figure 11 is a cut away top view illustration of another embodiment of a wheel lock.

[0021] Figure 12 is an illustration of an embodiment of an expandable safety rail assembly.

Detailed Description

[0022] The invention will now be described with respect to various embodiments. The following description provides specific details for a thorough understanding of, and enabling description for, these embodiments of the invention. However, one skilled in the art will understand that the invention may be practiced without these details. In other instances, well known structures and functions have not been shown or described in detail to avoid unnecessarily obscuring the description of the embodiments of the invention. References to "one embodiment" or "an embodiment" do not necessarily refer to the same embodiment, although they may.

[0023] Figure 1 is an illustration of an embodiment of an expandable scaffold. The scaffold comprises a platform assembly 116, leg assemblies 118 including ladder assemblies 114, and at least one safety rail assembly 112. The platform assembly 116 provides a place for workers to stand; the safety rail assembly 112 helps prevent workers from falling; the ladder assemblies 114 provide a way up to and down from the platform assembly 116; and the leg assemblies 118 support the other assemblies above the ground.

[0024] Figure 2 is an illustration of an embodiment of an expandable scaffold platform assembly 116. Expansion capability is provided by a lower shelf 202 that slides, in a telescoping fashion, in a lengthwise direction with respect to an upper shelf 204. Telescoping enables the platform length to be expanded or contracted, without causing the platform length to differ from the distance between the ladder assemblies 114. At least one inner rail 211 of the lower shelf 202 slides into at least one outer rail 212 of the upper shelf. A shelf transition 208 alleviates the abruptness of the edge between the upper shelf 204 and lower shelf 202. A slide lock 206, when engaged, prevents the sliding action of the upper shelf 204 with respect to the lower shelf 202. The platform assembly 116 may comprise one or more retractable supports 216 to provide support for construction materials, such as sheets of drywall or plywood. Safety rail retainers 214 receive posts to support the safety rail assembly 112.

[0025] Figure 3 is a bottom view illustration of an embodiment of an expandable scaffold platform rail assembly. The inner rail 211 slides within the outer rail 212. A flange 308 of the outer rail 212 supports the upper shelf 204, and a flange 310 of the inner rail 211 supports the lower shelf 202. The flange 310 of the inner rail 211 may engage the lower shelf 202 to prevent lateral motion and shear motion of the lower shelf 202. A stop 316 of the outer rail 212 engages a stop 318 of the inner rail 211 to prevent the inner rail 211 from coming completely free of the outer rail 212. A lock hole 314 of the outer rail 212 aligns with lock holes 306 of the inner rail 211. Insertion of a pin

through the lock holes prevents the inner rail 211 from sliding within the outer rail 212, hence preventing the upper shelf 204 from sliding with respect to the lower shelf 202.

[0026] Figures 4 and 5 are illustrations of an embodiment of an upper shelf 204 of an expandable scaffold platform assembly. The shelf transition 208 is fixed to the upper shelf 204 and provides a graded transition between the upper shelf 204 and the lower shelf 202. This may reduce the likelihood of injuries from tripping on the abrupt edge that may otherwise result between the upper shelf 204 and lower shelf 202.

[0027] Figure 6 is a side view illustration of an embodiment of an expandable scaffold platform rail assembly. A slide lock 206 comprises a housing 606 and a locking pin 602. In an unlocked position shown, the spring 604 is under compression and the locking pin 602 does not pass through the lock hole 314 of the outer rail 212 and one of the lock holes 306 of the inner rail 211. In this position the locking pin 602 may engage the housing 606 in a manner that prevents the spring 604 from urging the locking pin 602 toward the rails. For example, the locking pin 602 may be secured within a slot of the housing 606.

[0028] When the locking pin 602 is not secured in the unlocked position shown, the spring 604 may urge the locking pin 602 toward the rails. When the lock hole 314 of the outer rail 212 is aligned with one of the lock holes 306 of the inner rail 211, the locking pin 602 may be urged through the holes, preventing the inner rail 211 from sliding within the outer rail 212.

[0029] Figure 7 is a cut-away front view illustration of an embodiment of an expandable scaffold platform rail assembly. The locking pin 602 is shown in the locked position. The outer rail 212 is formed to comprise a flange 308 and a gap 702. The flange 310 of the inner rail, comprising a plurality of platform stabilizer posts 312, extends beyond the gap 702, and provide a stable supporting surface for the lower shelf 202. The posts 312 may protrude through holes in the lower

shelf 202 to provide stabilization against lateral motion and shear. A stop 318 of the inner rail 211 contacts a stop 316 of the outer rail 212 when the platform assembly 116 is at full extension.

[0030] Figure 8 is an illustration of an embodiment of a leg assembly of an expandable scaffold. A leg 802 provides support for the scaffold. A sleeve 804 slides over the leg, and acts as a moveable mount for a spring 808 loaded lock pin 806. The height of the platform assembly 116 may be set by adjusting the position of the sleeve 804 on the leg, and then secured by setting the lock pin 806 through holes in the sleeve 804 and the leg 802. The scaffold may comprise four legs 802, each having a sleeve 804. The sleeves 804 on one end of the scaffold may be coupled to the outer rail 212 of the platform assembly 116, and the sleeves 804 on the other side of the platform assembly 116 may be coupled to the inner rail 211 of the platform assembly 116. The outer rail 212 and inner rail 211 may be bolstered by supports 811 of the sleeves 804.

[0031] Figure 9 is an illustration of an embodiment of a leg assembly including a wheel lock. A post 904 atop the leg 802 provides for mounting extensions to the leg 802, enabling the scaffolding to be increased in height. The leg 802 comprises a casing 906 and a rod 908 mounted within the casing 906. A handle 912 is joined to the rod 908. The handle 912 moves within a slot 911, such as a J-slot, and may provide for moving and fixing the rod 908 into tension against a spring 902. A worker on the platform assembly 116 may lift and rotate the rod 908 to unlock the wheel 920, then urge the scaffold into a new position. Once in position, the worker can rotate the rod 908 from the fixed position so that the spring 902 may urge the rod 908 downward through a guide 914 and an aperture 916 in a caster 918. The caster 918 is coupled to a wheel 920 and is rotationally mounted to the leg 802.

[0032] Figure 10 is a cut away top view illustration of an embodiment of a wheel lock. The rod 908 may have a substantially square cross-section. An aperture 916 in the caster 918 may be formed with eight

points, thus passing the rod 908 as urged by the spring 902 only when the rod 908 is in orientations that align corners of the rod 908 with points of the aperture 916. Once the rod 908 is passed through the aperture 916, the caster 918 is inhibited from rotating, and the wheel 920 is locked in position. Furthermore, the rod 908 may contact the wheel 920 in such a manner that the wheel 920 is inhibited from rotating. Thus, in the locked position, neither the caster 918 nor the wheel 920 may substantially rotate.

[0033] Figure 11 is a cut away top view illustration of another embodiment of a wheel lock. The aperture 916 comprises sixteen points, thus enabling the rod 908 to pass and lock the wheel 920 in twice as many orientations as the embodiment of Figure 10.

[0034] Figure 12 is an illustration of an embodiment of an expandable safety rail assembly. The safety rail assembly 112 may be mounted on either side to the platform assembly 116 by inserting the vertical supports 1108 into the safety rail retainers 214. Gates 1102 may pivot to provide additional protection from falls. The rail assembly 112 comprises a first section 1104 formed to slide within a second section 1106 as the platform assembly 116 is expanded and contracted.

[0035] The scaffolding may be rolled into position and expanded or contracted to provide a platform work area of suitable length. A worker may lock the wheels 920 and climb to the platform assembly 116 using the ladder assembly 114. The wheels 920 may be unlocked, the scaffolding repositioned, and the wheels 920 again locked without the worker dismounting the platform assembly 116.

[0036] Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise," "comprising," and the like are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to." Words using the singular or plural number also include the plural or singular number respectively. Additionally, the words "herein," "above," "below" and words of similar import, when used in this application, shall refer to this application as

a whole and not to any particular portions of this application. When the claims use the word "or" in reference to a list of two or more items, that word covers all of the following interpretations of the word: any of the items in the list, all of the items in the list and any combination of the items in the list.